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Factors Influencing Production and Market Participation among Smallholder Tomato Growers in Makhuduthamaga Municipality, Greater Sekhukhune District of Limpopo Province, South Africa

Abstract: Agriculture plays a significant role in the economic sector in Limpopo province in terms of its contribution to the economy, and the number of employment opportunities it produces within local communities. The majority of people involved in agricultural practices are emerging farmers and smallholder/small scale farmers. The aim of the study was to determine and profile factors influencing production and market participation among smallholder tomato growers in Madibong and Manganeng Villages, Makhuduthamaga Municipality in Greater Sekhukhune District, South Africa. A purposive sampling technique integrated with a random sampling technique were used to collect primary data from 100 smallholder tomato farmers using structured questionnaires. The Multiple Linear Regression and the Logistic Regression models were used to analyse the socio-economic factors that influence tomato production and market participation among smallholder tomato farmers in the study area. The results of the study revealed that extension access, fertiliser application, marital status, income from production and use of agricultural equipment positively influence tomato production. While, the educational level, gender

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of the farmer, farming experience, marital status and farm size positively influence market participation, market distance negatively influences market participation among smallholder tomato farmers. Based on the findings of the study, it is recommended that there should be a comprehensive producer support programme that focuses primarily on subsidising smallholder farmers when purchasing production inputs.

Keywords: tomato growers, market participation, production, Logistic Regression Model, Multiple Linear Regression Model.

1. Introduction

The agricultural sector plays an indispensable part in the livelihoods of the poorest households mainly because it is a primary source of income for the rural population and contributes to foreign exchange earnings for Southern African economies (SAT, IDASA 2011). The agricultural sector in the Greater Sekhukhune District of the Limpopo Province comprises both commercial and subsistence farming with Ephraim Mogale and Elias Motsoaledi Local Municipalities, housing one of the largest clusters of commercial farming in the country (District Rural Development Plan 2016).

Smallholder farmers in the Greater Sekhukhune District are finding it difficult to obtain high crop yields due to low and unreliable rainfall (Mpandeli, Nesamvuni, Maponya 2015). For instance, the farmers in Madibong and Manganeng villages are practicing a mono-cultural farming system, with low production evident in most cases. Smallholder farmers depend on the production of agricultural commodities for sustainable livelihood even though agricultural policies and market conditions are not making it easy (Segage, Nkoana, Cholo 2018). The extent to which smallholder farmers participate in the market depends on the location, socio-economic and institutional factors (Baloyi 2010). Although research has been done on commodities such as groundnuts (Segage, Nkoana, Cholo 2018; Mogale 2015), limited or no research has been done on tomato in particular and or on how smallholder tomato farmers can produce sufficient quantity to allow them to participate in the market.

Ahmad Al-Shadiadeh, Fadhil Al-Mohammady and Taleb Abu-Zahrah (2012) stated that the socio-economic and institutional factors are known to influence agricultural productivity among smallholder farmers in terms of the quantity and quality of agricultural produce. Mohammad Altarawneh, Ebraheem Altahat and Ali Al-Sharafat (2012) indicate further that the influential degree of socio-economic and institutional factors depends on the type of crop and its associated production technologies. Factors such as age, labour availability, farm size, income, household size, marital status, educational level and farming experience, according to Angelina Masunga (2014), are the socio-economic and institutional factors that highly influence tomato productivity amongst smallholder farmers. Although studies indicate that socio-economic and institutional factors influence

production, Ibrahim Usman et al. (2013) assert that the two main socio-economic factors affecting production are lack of capital, and extension services. Moreover, the major socio-economic factors influencing production are age, annual income and household size (Ani, Umeh, Weye 2013).

Smallholder farmers in South Africa are unable to participate in markets because they produce a small surplus that cannot be marketed in markets and cannot attract international markets (Ngemntu 2010).The major factors affecting market participation among smallholder farmers are grouped into the conceptual framework as household and household head characteristics (age, gender, education level and marital status), household endowment of crop production factors (land size), market factors (distance to nearest market, market infrastructure, and market information) and institutional services (access to extension and credit services) (Mango et al. 2018; Segage, Nkoana, Cholo 2018; Selowa, Lefophane, Belete 2015; Hlongwane, Ledwaba, Belete 2014). Nelson Mango et al. (2018) indicate that the important factors that influence the farmers' decision to participate or not to participate in selling their produce in the market are the level of education and age of the household head. This may be due to the fact that older people are more risk averse, slow to adopt technology and less physically fit to transport the production to the market (Mbitsemunda, Karangwa 2017).

According to Hangwelani Mathagu (2016), the policies that are now in place in South Africa are not commodity-based. Hence, this study hypothesises that this is also the case for production and market participation of smallholder tomato farmers. The study will contribute to the body of knowledge that may form the basis for a commodity-based policy that will enable smallholder tomato farmers to produce and participate in both local and international markets. Given that tomato is one of the important vegetables grown by smallholder farmers in Makhuduthamaga Municipality, a specific and targeted policy will ensure that tomato production and marketing by smallholder farmers yields food security and poverty alleviation through income generation. Therefore, a study of this nature is necessary to be conducted and it is on this basis that this study strives to identify and analyse the factors that influence tomato production and market participation among smallholder growers in Makhuduthamaga Municipality in Greater Sekhukhune District of Limpopo Province.

2. Research Methodology

2.1. Study area

The study was conducted at Madibong and Manganeng villages of Makhudu-thamaga Municipality in the Greater Sekhukhune District, Limpopo Province.

The Greater Sekhukhune District lies in the South-eastern part of the province. The district is rural and is characterised by high levels of poverty and lack of social and economic development opportunities (Monyela 2007). The reasons behind the lack of social and economic development amongst others are, lack of basic infrastructures such as water, sanitation, roads, public transport, electricity, and telecommunication (District Rural Development Plan of Sekhukhune 2016). According to Phokele Maponya (2013), the average annual rainfall in the Sekhukhune District is less than 600 mm. The district is situated in semi-arid areas and always experiences water shortages. This is a serious problem, particularly for an area that has farming as the main activity and source of livelihood for its residents. For instance, smallholder agriculture accounts for 70% of the farming activities in the district whilst 30% is commercial agriculture (Mpandleli, Nesamvuni, Maponya 2015).

2.2. Data collection

The study used primary data collected in 2020, where purposive sampling integrated with a simple random sampling technique were used to collect data from 100 smallholder tomato growers in Madibong and Manganeng villages, respectively. The study used a purposive simple random sampling technique to select the respondents in the two selected villages of Madibong and Manganeng. The random sampling technique was appropriate since it gave the smallholder tomato farmers an equal opportunity to be selected. Only smallholder tomato farmers that are residing in Madibong and Manganeng villages were selected for the purpose of this study since they share common cropping patterns and social characteristics. A structured questionnaire and face-to-face interviews were used to gather data from the respondents.

2.3. Data analysis

The Multiple Linear Regression Model was used to determine and analyse the factors influencing the tomato production among smallholder farmers. The model is suitable to determine and analyse the factors influencing the tomato production among smallholder farmer since the dependent variable (tomato yield) is predicted by multiple explanatory independent variables. While, the Logistic Regression Model was used to determine and analyse which socio-economic factors have the likelihood of influencing the participation of the smallholder tomato farmers in the market.

The model is suitable to determine and analyse the socio-economic factors that influence market participation among smallholder tomato farmers since the

Table 1. Description of variables for tomato production (Multiple Linear Regression Model)

Tabela 1. Opis predyktorów produkcji pomidorów

Variables	Description of variables	Measurement
Dependent variable		
Tomato production yield	Amount of tomato produced per production cycle	Kg
Independent variables		
Labour	Number of labours utilised in the production	Numbers
Land size	Size of land utilised for tomato production	Hectares
Source of labour	1 – if labour is hired, 0 – if otherwise	Dummy
Fertilisers application	1 – if the farmer uses fertilisers, 0 – if otherwise	Dummy
Farming experience	Number of years a farmer has been producing	Years
Agricultural equipment	1 – if a farmer is using power tools, 0 – if otherwise	Dummy
Extension service	Extension accessibility by the respondent, 1 – if accessible, 0 – if otherwise	Dummy
Education	1 – if the farmer has formal education, 0 – if otherwise	Dummy
Age	Age of the smallholder farmer	Years
Marital status	1 – if the farmer is married, 0 – if otherwise	Dummy
Income from tomato production	Amount of income obtained from tomato production sales per production cycle	Rand
Size of the household	Number of household members	Numbers

Source: own study.
Źródło: opracowanie własne.

Logistic Regression Model is useful in explaining the relationship between the dependent binary variable and nominal, ordinal, and interval or ratio-level independent variables (Al-Shadiadeh, Al-Mohammady, Abu-Zahrah 2012). Thus, it was necessary to use in this study. The logistic model was used to estimate the likelihood of the smallholder tomato farmers to participate in the market after their production cycle.

General model for Multiple Linear Regression:

$$\text{Output } (Y) = \alpha + \beta_1 X_1 + \beta_2 X_2 + \beta_3 X_3 + \ldots + \beta_n X_n + Ui$$

Where α indicate the value of the dependent variables when all the values of independent variable are zero and each β estimate indicated the average change in Y in relation with a unit of change in X, whereas controlling other explanatory variables in the model.

Model specification:

$$\text{Output } (Y) = \alpha + \beta_1 \text{ (number of labour)} + \beta_2 \text{ (seed variety)} + \beta_3 \text{ (land size)} + \beta_4 \text{ (fertiliser)} + \beta_5 \text{ (pesticides)} + \beta_6 \text{ (farming experience)} + \beta_7 \text{ (grant)} + \beta_8 \text{ (machinery)} + \beta_9 \text{ (source of labour)} + Ui$$

Table 2. Description of variables for market participation (Logistic Regression Model)

Tabela 2. Opis predyktorów udziału w rynku

Variables	Description of variables	Measurement
Dependent variable		
Market participation	1 – if the farmer participates, 0 – if otherwise	Dummy
Independent variables		
Distance to the market	Distance to the market	Km
Access to credit	1 – if the farmer has access to credit, 0 – if otherwise	Dummy
Transportation	1 – if the farmer use transport to the market, 0 – if otherwise	Dummy
Income from tomato production	The amount of income obtained from the sale of tomato per production cycle	Rand
Occupation	1 – if the farmer is a pensioner, 0 – if otherwise	Dummy
Extension service	Extension accessibility by the respondent, 1 – if accessible or 0 – if otherwise	Dummy
Education	1 – if the farmer has formal education, 0 – if otherwise	Dummy
Access to market information	1 – if the farmer has access to market information, 0 – if otherwise	Dummy
Tomato production yield	Amount of tomato produced per cycle	Kg
Age	Age of the smallholder farmer	Years
Gender	1 – if the farmer is male, 0 – if otherwise	Dummy
Marital status	1 – if the farmer is married, 0 – if otherwise	Dummy
Size of the household	Number of household members	Numbers

Source: own study.
Źródło: opracowanie własne.

The general model for the Logistic Regression Model:

$$L_i = \mathrm{L_n}\left(\frac{P_i}{1 - P_i}\right) = Y_i = B_0 + B_i X_i + \ldots + B_n X_n + Ui$$

Where Y_i – market participation of smallholder tomato farmers; P_i – Probability that a farmer is participating in the market; $1 - P_i$ – probability that a farmer is not participating in the market.

Model specification:

Market participation = $\alpha + \beta_1$ age + β_2 gender of the farmer + β_3 level of education + β_4 marital status + β_5 market information + β_6 household size + β_7 distance + β_8 extension + β_9 market infrastructure + β_{10} farming experience + β_{11} production yield + β_{12} transportation + β_{13} occupation + Ui.

3. Results

This section represents the empirical results from the Multiple Linear Regression (Table 3) and the Logistic Regression Analysis (Table 4).

Table 3 shows the results from the Multiple Linear Regression Model and the coefficients of factors influencing tomato production of smallholder growers in Madibong and Manganeng villages, the significance level, t-ratio and the standard error of the estimates.

The adjusted R^2 obtained from the model result is 68% and the adjusted R^2 indicates that the model fit is good since about 68% of the variation in the dependent variable is explained by the independent variables and the remaining 32% is explained by the unknown variables. The significance level shows the amount of change on the dependent variable when an independent variable positively or negatively changes. The t-ratio is a ratio of the departure of an estimated parameter from its notional value. T-ratios and standard error and are used in testing the hypothesis.

4. Discussion of Significant Factors Influencing Production among Smallholder Tomato Farmers

4.1. Marital Status

The marital status of smallholder tomato growers in Madibong and Manganeng was found to be negatively and statistically significant at 1%. There is a negative relationship between the marital status and production output of smallholder farmers. The negative relationship indicates that when the smallholder farmers get

Table 3. The Multiple Linear Regression results

Tabela 3. Wyniki wielokrotnej regresji liniowej

Variable	Standard error	Standardised coefficient	T-ratio	Significance level
Constant	19.041	–	1.995	0.291
Age of the farmer	0.374	0.259	0.693	0.493
Marital status	0.009	−0.028	−3.111	0.009*
Household size	1.091	0.539	0.494	0.709
Fertiliser application	1.214	5.973	4.920	0.049**
Farmers experience	1.506	−1.632	−1.084	0.594
Educational level	11.058	12.109	1.095	2.034
Sources of labour	0.054	0.096	1.777	0.359
Number of labour used during production	0.622	−0.493	−0.793	0.372
Agricultural equipment (machinery)	0.667	3.070	4.603	0.005*
Extension access	1.677	6.332	3.776	0.060***
Income from production	0.009	0.087	9.666	0.001*

Adjusted R-square: 68%, Dependent variable: output of tomato per production cycle

*, **, *** represent 1% level of significance, 5% level of significance and 10% level of significance respectively.

Source: own study based on field survey from 2020.
Źródło: opracowanie własne na podstawie badań terenowych w 2020 r.

married, their production yield might decrease by 0.028kgs. This is in line with E. Ekong's (2000) findings, where it was found that the farmer's marital status affects farming activities because of the change in responsibilities.

4.2. Agricultural Equipment

The agricultural equipment that smallholder tomato farmers utilise during production was found to be positively and statistically significant at 1%. Therefore, there is a positive relationship between the machinery utilised, and the amount of tomato produced by smallholder farmers per production cycle. The positive relationship indicates that when farmers use agricultural equipment during production, the production yield might increase by 3.070 kgs.

Table 4. The Logistic Regression Model results

Tabela 4. Wyniki modelu regresji logistycznej

Variables	β	Standard error	Wald	Significance level
Educational level	1.849	0.876	3.593	0.053***
Age of the farmer	−1.439	1.645	0.361	0.270
Occupation of the farmer	0.065	2.411	−1.219	0.248
Household size	0.197	2.005	1.003	0.124
Marital status	10.415	3.687	3.728	0.061***
Market distance	−1.564	0.626	6.249	0.034**
Farming experience	2.528	0.523	4.834	0.033**
Source of income	−0.006	0.004	2.439	0.118
Gender	7.322	3.563	3.413	0.053***
Farm size	4.078	2.0130	3.498	0.072***

−2 log likelihood: 20.856, Chi-squared: 23.159, Cox & Snell R-square: 67.7%, % cases correctly predicted: 70.1%

, * represent 5% level of significance and 10% level of significance respectively.

Source: own study based on field survey from 2020.
Źródło: opracowanie własne na podstawie badań terenowych w 2020 r.

4.3. Income from Production

Income obtained from production output sold by the smallholder tomato farmers was found to be positively and statistically significant at 1%, indicating a positive relationship between income from the sales of tomatoes and the production yield. The findings of this study are in line with Elias Selopyane's (2014) findings, who found that income from the sales of crops that farmers are producing is important since it determines whether the farmers must continue with production or not. The positive relationship between income obtained from production output sold and production yield indicates that as the income obtained from production output is increased, the farmers will focus more on farming activities that might increase the production yield by 0.087kgs.

4.4. Fertiliser Application

Fertilisers that smallholder farmers use during production (fertiliser application) was found to be positively and statistically significant at 5%, indicating a positive

relationship between fertiliser application and tomato production yield. An increase in the quantity of fertiliser applied during production might result in an increase of 5.973kgs of tomato production yield. The findings of this study are in line with Mapula Lefophane's (2012) results, where fertiliser was found to be positively and statistically significant to the productivity of smallholder farmers, meaning an increase in fertiliser application increases agricultural productivity.

4.5. Access to Extension Services

Access to extension services refers to the number of extension contacts either through farm visits made to farmers or training sessions received during the production season (Anyiro, Oriaku 2011). Access to extension services by smallholder tomato farmers was found to be positively and statistically significant at 10%, indicating a positive relationship between the farmers' access to extension services and their production yield. The results of this study are in line with the study conducted by Charles Machethe (2004) who indicated that smallholder agricultural growth cannot be achieved without access to farmers' support services, and that adequate farmers' support services for smallholder farmers can significantly increase agricultural productivity. The other independent variables – age of the farmer, household size, farmers experience, educational level, source of labour; number of labour used during production are found to be not significant when it comes to the production of tomato.

Table 4 shows that The Cox and Snell R-square of the model is 67.7%. The Cox and Snell R-square shows that the model fit is good since about 67.7% of the variation in the dependent variable is explained by the independent variables and the remaining 32.3% is explained by the unknown variables. The likelihood of the model is 20.856 and indicates that there is a 21% chance of the variables in the model to be incorrectly predicted. The choices of the explanatory variables were based on data availability, economic theory and the literature.

5. Discussion of Factors Influencing Market Participation among Smallholder Tomato Farmers

5.1. Educational Level

Educational level was found to have a positive coefficient of 1.849 and was statistically significant at 10% level. The positive coefficient indicates that there is a high probability that educated tomato farmers would participate in tomato marketing than those who are less educated in Madibong and Manganeng villages. The findings of the study contradict Tanya Machethe's (2016) findings, where

the educational level of the farmer was found to be negatively and statistically insignificant towards market participation. According to Mpuzu Sikwela (2013), smallholder farmers who are educated are more likely to find marketing information and utilise the information better to integrate their product market.

5.2. Gender of the Farmer

The gender of the farmer was statistically significant at 10% level and was found to have a positive effect on the likelihood of smallholder tomato farmers participating in the market in Madibong and Manganeng villages. The findings of this study are in line with the findings of Jan Hlongwane, Lesetja Ledwaba and Abenet Belete (2014) who also found gender to be positively and statistically significant towards market participation.

Byron Reyes et al. (2012) concur with the findings of this study by suggesting that households that are headed by males are more likely to participate in the market as opposed to female-headed households in Madibong and Manganeng villages. Mathagu (2016) also notes the relationship between gender and market participation by indicating that men are more likely to participate in the market compared to their female counterparts since men are the ones who are mostly engaged in agricultural activities while female counterparts are engaged in off-farm activities. However, Pilile Hlomendlini (2015) indicates that females are the main participants in the market than males.

5.3. Marital Status

Marital status was statistically significant at 10% level and was found to have a positive effect on the likelihood of smallholder tomato farmers participating in the market. This implies that the level of market participation to increase depends on the marital status of the smallholder tomato farmer. This finding is in line with Hlongwane, Ledwaba and Belete (2014) who also found marital status to be positively and statistically significant towards influencing the participation of smallholder farmers in the market. According to Mapule Nkadimeng (2019), the farmers' marital status determines the capability of the farm households to allocate all their resources efficiently on both farm and non-farm activities to boost the household income.

5.4. Farm Size

Farm size was statistically significant at 10% level with a positive coefficient of 4.078 and was found to have a positive effect on the likelihood of smallholder tomato

farmers participating in the market. This implies that the level of market participation would increase as the land size utilised during production by smallholder tomato farmers increases. The findings of this study are in line Joshua Baloyi (2011) who also found farm size to be positively and statistically significant towards the participation of smallholder farmers in the market. According to Raghbendra Jha, Hari Krishnan Nagarajan and Subbarayan Prasanna (2005, as cited in Mathagu 2016), there is a positive correlation between land size and production level in smallholder agriculture, which may lead to increased market participation.

5.5. Farming Experience

The farming experience of the smallholder farmers was statistically significant at 5% and was found to have a positive effect on the likelihood of smallholder tomato farmers participating in the market. This implies that market participation would increase with the number of years the smallholder farmers have been involved in farming. The findings of this study are not in line with M.N.D.F. Abeykoon, Jeevika Weerahewa and G.L.L.P. Silva (2013) who indicate that as the experience of the farmer in production increases, the probability of the farmer to participate in the market declines. The findings of this study are in line with Baloyi's (2011) finding that farmers' experience in production is positively and statistically significant towards influencing the market participation of smallholder farmers.

5.6. Market Distance

The distance that smallholder tomato farmers have to travel in order to reach the market was statistically significant at 5% and was found to have a negative effect on the likelihood of smallholder tomato farmers to participation in the market. This implies that the level of market participation will decrease as more distance is travelled to the market. The findings of the study are in line with Moraka Makhura (2001) who found that distance to the market negatively influences both the decision to participate in markets and the proportion of output sold. Also, according to Hlongwane, Ledwaba and Belete (2014), distance plays an important role in determining whether the farmer is able to participate in the market or not.

6. Conclusion and Recommendations

This study was an attempt to fill the gap of knowledge on the factors influencing production and market participation among smallholder tomato growers in Madibong and Manganeng Village of Makhuduthamaga Municipality. The result presented in this

study revealed some factors which influenced market participation and production of tomato among the farmers. The factors that influenced the level of market participation and the output yield among the tomato farmers included marital status, income from production, educational level and age of the farmer. Moreover, the general conclusion that have emerged from of this study is that access to extension service as a direct factor influencing production can help smallholder tomato farmers to increase their production output and participation in the market provided the extension officer provides farmers with training on production and marketing strategies.

Based on the findings of the study, it is recommended that the local municipality invest more in rural adult education in order for the farmers to adopt new farming skills and utilise the market information provided. Moreover, adult education will lead to rural development and job creation in the study area. Therefore, the study recommends that the South African government should implement a comprehensive producer support that focuses primarily on subsidies to smallholder farmers when purchasing production input such as fertilisers and pesticides can encourage farmers to continue production.

References

Abeykoon M.N.D.F., Weerahewa J., Silva G.L.L.P. (2013). Determinants of market participation by indigenous poultry farmers: A case study in Anuradhapura District in Sri Lanka. *Tropical Agricultural Research*, *24* (4), 347–361. DOI:10.4038/tar.v24i4.8020.

Al-Shadiadeh A.N., Al-Mohammady F.M., Abu-Zahrah T.R. (2012). Factors influencing adoption of protected tomato farming practices among farmers in Jordan Valley. *World Applied Sciences Journal*, *17* (5), 572–578.

Altarawneh M., Altahat E., Al-Sharafat A. (2012). Evaluation of vegetables farmers participation in agricultural extension activities. *American Journal of Agricultural and Biological Sciences*, *7* (2), 201–206. DOI:10.3844/ajabssp.2012.201.206.

Ani D.P., Umeh J.C., Weye E.A. (2013). Profitability and economic efficiency of groundnut production in Benue State, Nigeria. *African Journal of Food, Agriculture, Nutrition and Development*, *13* (4). DOI:10.18697/ajfand.59.10975.

Anyiro C.O., Oriaku B.N. (2011). Access and investment of formal micro credit by smallholder farmers in Abia State, Nigeria: A case study of Absu Micro Finance Bank, Uturu. *Journal of Agricultural Sciences – Sri Lanka*, *6* (2), 69–76. DOI:10.4038/jas.v6i2.3861.

Baloyi J.K. (2010). *An Analysis of Constraints Facing Smallholder Farmers in the Agribusiness Value Chain: A Case Study of Farmers in the Limpopo Province*. Master's Thesis. Pretoria: University of Pretoria.

District Rural Development Plan (2016). *Sekhukhune District Municipality Rural Development Plan*. Pretoria, South Africa.

Ekong E.W. (2000). *Group and Non-Group Women Farmers Access to Agricultural Production, Responses in Akwa Ibom State*. Ph.D. Thesis. Ibadan: University of Ibadan.

Hlomendlini P.H. (2015). *Key Factors Influencing Smallholder Market Participation in the Former Homelands of South Africa: A Case Study of the Eastern Cape*. Master's Thesis. Cape Town: Stellenbosch University.

Hlongwane J.J., Ledwaba L.J., Belete A. (2014). Analysing factors affecting market participation of maize farmers: A case study of smallholder farmers in greater Giyani Local Municipality of the Mopani District, Limpopo Province. *African Journal of Agricultural Research*, 9 (10), 895–899. DOI:10.5897/AJAR12.1896.

Jha R., Nagarajan H.K., Prasanna S. (2005). Land fragmentation and its implications for productivity: Evidence from Southern India. ASARC Working Paper 2005-01. The Australian National University. Australia South Asia Research Centre.

Lefophane M.H. (2012). *Comparative Analysis of Technical Efficiency Levels of Emerging Maize and Green Beans Farmers with and without Access to Formal Agricultural Credit Along Food Value Chains in Maruleng Municipality, Limpopo Province of South Africa*. Master's Thesis. Turfloop: University of Limpopo.

Machethe C.L. (2004). *Can Agriculture Reduce Poverty? Agriculture and Poverty in South Africa*. Master's Thesis. Pretoria: University of Pretoria.

Machethe T.A. (2016). *Economic and Marketing Analysis of Smallholder Broiler Production in Mopani District of Limpopo Province, South Africa*. Master's Thesis. Turfloop: University of Limpopo.

Makhura M.T. (2001). *Overcoming Transaction Costs Barriers to Market Participation of Smallholder Farmers in the Northern Province of South Africa*. Ph.D. Thesis. Pretoria: University of Pretoria.

Mango N., Makate C., Francesconi N., Jager M., Lundy M. (2018). Determinants of market participation and marketing channels in smallholder groundnut farming: A case of Mudzi District, Zimbabwe. *African Journal of Science, Technology, Innovation and Development*, 10 (3), 311–321. DOI:10.1080/20421338.2018.1457274.

Maponya P.I. (2013). *Climate Change and Agricultural Production in Limpopo. Impacts and Adaptation Options*. Ph.D. Thesis. Pretoria: University of South Africa.

Masunga A.W. (2014). *Assessment of Socio-Economic and Institutional Factors Influencing Tomato Productivity Amongst Smallholder Farmers: A Case Study of Musoma Municipality, Tanzania*. Master's Thesis. Morogoro: Sokoine University of Agriculture.

Mathagu H.T. (2016). *Market Participation of Smallholder Sunflower Farmers in Sekhukhune District of Limpopo Province, South Africa*. Master's Thesis. Turfloop: University of Limpopo.

Mbitsemunda J.P, Karangwa A. (2017). Analysis of factors influencing market participation of smallholder bean farmers in Nyanza District of Southern Province, Rwanda. *Journal of Agricultural Science*, 9 (11), 99–111. DOI:10.5539/jas.v9n11p99.

Mogale M.F. (2015). *Factors Affecting Production and Marketing of Smallholder Groundnuts Farmers in Moshakga Village in Mopani District Approach*. Bachelor's Thesis. Turfloop: University of Limpopo.

Monyela M.T.D. (2007). *Food Security Projects with Reference to Layers at Makhuduthamaga Municipality, Greater Sekhukhune District in Limpopo Province*. Master's Thesis. Turfloop: University of Limpopo.

Mpandeli S., Nesamvuni E., Maponya P. (2015). Adapting to the impacts of drought by smallholder farmers in Sekhukhune District in Limpopo Province, South Africa. *Journal of Agricultural Science*, *7* (2), 115–124. DOI:10.5539/jas.v7n2pxx.

Ngemntu S.T. (2010). *An Investigation of the Production and Marketing Challenges Faced by Smallholder Farmers in Amahlathi Municipality: A Case Study of Zanyokwe Irrigation Scheme and Silwindlala Woman's Project*. Master's Thesis. Alice: University of Fort Hare.

Nkadimeng M.V. (2019). *Determinants of Market Participation and Profitability for Smallholder Nguni Livestock Farmers: Implications for Food Security and Livelihoods in the Limpopo Province, South Africa*. Master's Thesis. Turfloop: University of Limpopo.

Reyes B., Donovan C., Bernsten R., Maredia M. (2012). Market participation and sale of potatoes by smallholder farmers in the Central Highlands of Angola: A double hurdle approach. *Selected Poster Prepared for Presentation at the International Association of Agricultural Economics (IAAE), Triennial Conference, 18–24 August*. Foz do Iguaçu. Brazil. International Association of Agricultural Economists. DOI:10.22004/ag.econ.126655.

SAT [Southern Africa Trust], IDASA [African Democracy Institute] (2011). Public dialogue report: Can smallholder farmers address hunger in the region? *Southern Africa Regional Conference, 29–30 June 2011*. Pretoria.

Segage K., Nkoana M.A., Cholo M. (2018). Determinants of production and market participation of small-scale groundnut farmers in Legodi, Ramphele and Mokgohloa villages in Polokwane Municipality, Limpopo Province. *The 56th Annual Conference of the Agricultural Economics Association of South Africa (AEASA), 25–27 September, Cape Town, South Africa*. DOI:10.22004/ag.econ.284764.

Selopyane E.W. (2014). *Factors Influencing Tomato Production by Smallholder Farmers in the Greater Letaba Municipality*. Bachelor's Thesis. Turfloop: University of Limpopo.

Selowa L., Lefophane M.H., Belete A. (2015). Market participation in formal agricultural output markets: A case study of small-scale tomato producers in Limpopo Province, South Africa. *Journal of Human Ecology*, *50* (2), 161–167. DOI:10.1080/09709274.2015.11906870.

Sikwela M.M. (2013). *The Impact of Farmer Support Programmes on Market Access of Smallholder Farmers in the Eastern Cape and KwaZulu-Natal Provinces*. Ph.D. Thesis. Alice: University of Fort Hare.

Usman I., Taiwo A.B, Haratu D., Abubakar M.A. (2013). Socio-economic factors affecting groundnut production in Sabon Gari Local Government of Kaduna State, Nigeria. *International Journal of Food and Agricultural Economics*, *1* (1), 41–48. DOI:10.22004/ag.econ.156141.

Czynniki wpływające na produkcję i udział w rynku małych producentów pomidorów w gminie Makhuduthamaga, w dystrykcie Sekhukhune w prowincji Limpopo (Republika Południowej Afryki)

Streszczenie: Rolnictwo odgrywa znaczącą rolę w gospodarce prowincji Limpopo w Republice Południowej Afryki (RPA) pod względem produkcyjnym oraz tworzenia miejsc pracy dla społeczności lokalnych. Większość osób zaangażowanych w regionie w działalność rolniczą to nowi rolnicy i drobni producenci rolni. Celem badania było określenie i sprofilowanie czynników wpływających na produkcję i udział w rynku drobnych producentów pomidorów w wioskach Madibong i Manganeng w gminie Makhuduthamaga w dystrykcie Sekhukhune w RPA. W celu zebrania danych empirycznych od 100 drobnych producentów pomidorów posłużono się ustrukturyzowanymi kwestionariuszami i wykorzystano technikę celowego doboru próby połączoną z doborem losowym. Do analizy czynników społeczno--ekonomicznych wpływających na produkcję pomidorów i udział w rynku drobnych producentów na analizowanym obszarze zastosowano modele wielokrotnej regresji liniowej i regresji logistycznej. Wyniki przeprowadzonych badań wykazały, że dostęp do doradztwa, stosowanie nawozów, stan cywilny, dochody z produkcji i użytkowanie sprzętu rolniczego pozytywnie wpływały na wielkość produkcji pomidorów. Z kolei poziom wykształcenia, płeć, doświadczenie zawodowe i stan cywilny rolnika oraz wielkość gospodarstwa pozytywnie oddziaływały na udział w rynku badanych gospodarstw. Zidentyfikowano również negatywny wpływ odległości na udział w rynku badanych producentów rolnych. Na podstawie wyników badania rekomenduje się stworzenie kompleksowego programu wsparcia producentów rolnych ukierunkowanego na subsydiowanie zwłaszcza drobnych rolników przy zakupach środków do produkcji rolnej.

Słowa kluczowe: producenci pomidorów, udział w rynku, produkcja, model regresji logistycznej, model wielokrotnej regresji liniowej.